ACT and Region Catchment Strategy 2016–46

















ISBN: 978-1-921117-60-2

© Australian Capital Territory, Canberra 2016

This work is copyright. Apart from any use as permitted under the *Copyright Act 1968*, no part may be reproduced by any process without written permission from:

Director-General, Environment and Planning Directorate, ACT Government, GPO Box 158, Canberra ACT 2601.

Telephone: 02 6207 1923 Website: <u>www.environment.act.gov.au</u> Printed on recycled paper

Accessibility

The ACT Government is committed to making its information, services, events and venues as accessible as possible.

If you have difficulty reading a standard printed document and would like to receive this publication in an alternative format, such as large print, please phone Access Canberra on 13 22 81 or email the Environment and Planning Directorate at epd_communications@act.gov.au

If English is not your first language and you require a translating and interpreting service, please phone 13 14 50.

If you are deaf, or have a speech or hearing impairment, and need the teletypewriter service, please phone 13 36 77 and ask for Access Canberra on 13 22 81.

For speak and listen users, please phone 1300 555 727 and ask for Access Canberra on 13 22 81.

For more information on these services visit <u>http://www.relayservice.com.au</u>

Contents

Minister's Foreword	1
Chair's Foreword	3
ACT and Region Catchment Management Coordination Group commitment	
Acknowledgement of Country	9
Executive Summary Major factors that will shape the catchment over the next 30 years How we will respond to change Catchment Strategy's 5 themes and 19 actions	11 13 13 16
1. The ACT and Region Catchment Management Coordination Group	19
 2. The Catchment 2.1 Geographic area 2.2 Catchment facts 	21 21 23
 3. Major factors that will shape the catchment over the next 30 years 3.1 The multi-jurisdictional nature of the catchment 3.2 A growing population and planning for regional growth 3.3 A changing climate 	29 29 32 34
 4. The Catchment Strategy 4.1 Purpose 4.2 Developing the Catchment Strategy 	37 37 37
 5. Catchment Themes 5.1 Introduction to catchment themes 5.2 Summary of the Catchment Strategy's 5 themes and 19 actions 5.3 Theme: Governance, policy and planning 5.4 Theme: Communities 5.5 Theme: Regional development 5.6 Theme: Water 5.7 Theme: Land and Biodiversity 	41 41 42 44 47 50 56 61
 6.1 How will the ACT and Region Catchment Strategy be rolled out? 6.2 Adaptive management and implementation 	65 65 65
 7. Monitoring, evaluation and review 7.1 How will the Catchment Strategy be monitored? 7.2 Targets 7.3 Review 	67 67 67 67
Enanotes	68



Minister's Foreword



Vision:

'Government, community and industry working together to produce a healthy, productive, resilient and liveable catchment region.'

It is my pleasure to release the ACT and Region Catchment Strategy 2016--46.

The Catchment Strategy's Vision encapsulates the values of governments and key stakeholders working together to provide the healthy and liveable catchment that our communities desire.

Canberra/Queanbeyan is the largest inland city in Australia and the largest urban area within the Murray–Darling Basin. Canberra is also Australia's national capital city. It is surrounded by some of the fastest growing NSW council areas.

Land development and urbanisation in the ACT and Region has had detrimental impacts on the integrity of natural resources including water quality in our rivers, streams and lakes. Addressing these impacts involves collaboration with our bordering NSW councils and the NSW and Australian governments. Effective catchment management cannot and should not be constrained by jurisdictional boundaries.

Previous government reviews and processes such as the ACT Water Strategy 2014–44: Striking the Balance and the Commissioner for Sustainability and the Environment's Investigation into the State of the Watercourses and Catchments for Lake Burley Griffin (2012) have called for stronger catchment governance to protect the natural resources of the ACT and Region. The need for stronger collaboration has also been identified in the NSW Premier State Priorities 2015 (NSW Government) and the National Capital Plan (Australian Government).

In response to these recommendations, the ACT Government committed to establish an interjurisdictional coordination body, to be known as the ACT and Region Catchment Management Coordination Group. This commitment was further strengthened in August 2015 with the ACT Legislative Assembly establishing the Coordination Group as a statutory body and facilitating the appointment of an independent Chairperson, the Emeritus Professor Ian Falconer.

The ACT and Region Catchment Strategy establishes a 30 year vision developed on the premise that the region is the economic hub and future growth centre for south-east NSW. This Catchment Strategy looks to underpin regional development with sound catchment management principles.

The Catchment Strategy represents a pragmatic and achievable set of policy initiatives that can be achieved through the collaborative efforts of the jurisdictions involved.

After extensive public consultation during the drafting and finalisation of the Catchment Strategy, the scene is now set for us to work better together across borders. The release of the Catchment Strategy provides a truly integrated approach, at all levels, to catchment management in our region. The Coordination Group is commended for the collaborative demonstration of multi-jurisdictional levels of government working together to deliver the ACT and Region Catchment Strategy.

Simon Corbell MLA ACT Minister for the Environment and Climate Change



Chair's Foreword



The formation of the Coordination Group for the whole region of the ACT and surrounding NSW provides new opportunities for the catchment area at a time of challenge. It provides opportunities for improvement of the health of the land and water of the catchment, benefits for the communities and prevention of degradation of the environment at regional level.

The key government agencies are all represented in the Group at the most senior level across the ACT, the adjacent NSW government areas, the National Capital Authority and Icon Water. The catchment communities are represented by the Chair of the Upper Murrumbidgee Catchment Coordinating Committee. The time for this coordination is opportune, with the ACT Basin Priority Project and the ACT Water Resource Plan nearing planning completion, the Upper Murrumbidgee Actions for Clean Water Plan underway, a new ACT Water Strategy 2014–44 in place, and the Catchment Health Indicator Program expanding across the region. There are also major urban, suburban, satellite town and rural residential developments proposed or progressing across the area.

Coordination of land, water and natural resource management at the top level will enable better outcomes for the region, with enhanced sustainability and resilience to climate change and population pressure. The Group has endorsed this regional long-term strategic plan, which will help to identify and prioritise achievable outcomes for the catchment and to implement them.

Positive outcomes in the region can be assessed through social, economic and environmental gains in the short, medium and long term by establishing effective cooperation and coordination between the key participants.

The legislated functions of the Coordination Group are defined in the amendment to the *ACT Water Resources Act 2007,* passed with general support by the ACT Legislative Assembly in August 2015 [Water Resources (Catchment Management Coordination Group) Amendment Bill 2015].

We commend this Catchment Strategy for ACT and Regional application and I look forward to the challenge of implementing integrated water, land and natural resource management across the catchment.

Emeritus Professor Ian R. Falconer AO, DSc, Chair, ACT and Region Catchment Management Coordination Group

A

ACT and Region Catchment Management Coordination Group commitment

Mission

"The ACT and Region Catchment Management Coordination Group is committed to improving governance on catchment management within the region. The Coordination Group will work for the long-term benefit of the ACT and Region Catchment and all the people who reside therein. It will:

- be a responsive, dynamic and representative body which aims to work in a fair, open and collaborative manner
- take a holistic approach to understanding and managing the catchment
- promote a whole-of-catchment and governmental approach to improving the catchment's health in the long term, using the best available science and community engagement to support its work."

The following provides an overview of the Coordination Group member representatives and the value they bring to the Group.

ACT and Region Catchment Management Coordination Group

Emeritus Professor Ian Falconer

Professor Ian Falconer was appointed by the Minister as the Chair of the ACT and Region Catchment Management Coordination Group on 1 October 2015. The role of the Chair is to independently facilitate a collaborative process between jurisdictions to ensure best outcomes are achieved. Ian has extensive experience in water quality based research and consulting. Ian has spent considerable time as a university professor and consultant on the development of biological and pre-medical sciences. This, alongside with experience in staff training and academic administration will be invaluable to guiding the Coordination Group in developing and executing a regional catchment management strategy.

Upper Murrumbidgee Catchment Coordinating Committee

Chair, Dr Fiona Dyer, Community Representative

Dr Dyer was appointed by the Minister as the Community Representative of the Coordination Group on 1 October 2015. Currently, Dr Dyer is the Chair of the Upper Murrumbidgee Catchment Coordination Committee (UMCCC). Her experience working closely with Catchment Management Authorities, community organisations, indigenous groups and water management organisations makes her an ideal representative to engage and represent the community at a regional level.

Environment and Planning Directorate

Director-General Ms Dorte Ekelund

Environment and Planning Directorate (EPD) integrates ACT planning with the Government's environmental protection functions, including a strong commitment to address climate change and enhance land and water management.

The Directorate plays a critical role in a range of leading policies and programs to address climate change, stimulate the growth of the green economy, encourage innovation and investment in renewable energy, and protect and conserve our environment and water resources.

The Directorate is responsible for the Territory Plan and administers the Territory's development assessment and leasehold systems.

EPD is also the custodian of the ACT's spatial land management systems. The directorate also manages parks and conservation services for the ACT and is one of the major land management organisations in the ACT. This Directorate is also involved in catchment restoration projects and management of rural water catchments such as Googong Foreshores, the Lower Cotter Catchment and the Murrumbidgee River Corridor.

Transport Canberra and City Services Directorate

Director-General Ms Emma Thomas

The Transport Canberra and City Services (TCCSD) Directorate is responsible for managing Canberra's urban lakes and ponds, including managing stormwater control. City Services looks after the road network and stormwater network. Municipal infrastructure such as water sensitive urban design assets which treat stormwater quality and quantity provide total water cycle management for Canberra and are operated and maintained by TCCSD. As the maintenance managers of Canberra's green open spaces and waterways TCCSD assists in making Canberra a liveable city.

Chief Minister, Treasury and Economic Development Directorate

Head of Service Ms Kathy Leigh

Ms Kathy Leigh is the representative of Chief Minister, Treasury and Economic Development Directorate supports the Chief Minister at intergovernmental forums, notably the Council of Australian Governments. The Directorate manages and coordinates the ACT's relationships with other jurisdictions, most significantly with the Commonwealth, NSW, Australia's other capital cities and NSW Councils surrounding the ACT.

ACT Emergency Services Agency

Commissioner Mr Dominic Lane

The ACT Emergency Services Agency (ESA) comprises of the ACT Ambulance Service, ACT Fire & Rescue, the ACT Rural Fire Service, the ACT State Emergency Service and the ESA Support Services. ESA will play a key role in assisting the Coordination Group in the coordination of risk analysis, planning for; and management of; emergency situations such as storms, floods and bushfires.

ACT Health Directorate

Director-General Ms Nicole Feely is represented by the Chief Health Officer, Dr Paul Kelly

The ACT Health Directorate's role in respect to environmental health is to protect and promote the good health of the ACT community through the fostering of safe and healthy environments. Environmental health provides information, policy development, monitoring and enforcement in relation to a wide range of public health activities, including the Guidelines for Recreational Water Quality. The ACT Health Directorate provides a framework for the management of recreational water sites within the ACT, addressing risks from blue-green algae as well as microbial pathogens.

South East Local Land Services

General Manager Mr Derek Larsen

South East Local Land Services (South East LLS) brings together agricultural production advice, biosecurity, natural resource management and emergency management into a single organisation. South East LLS delivers services that add value to local industries, enhance natural resources, and protect industries from pests and disease and help communities respond to emergencies like flood, fire and drought across regional NSW. South East LLS will ensure that the natural assets, local industries, landholders and communities of the surrounding tablelands region are represented on the Coordination Group.

National Capital Authority

Chief Executive Mr Malcolm Snow

The National Capital Authority (NCA) is responsible for the management of some of Canberra's most nationally and culturally significant landscapes and attractions including the nationally iconic Lake Burley Griffin and surrounding lands. NCA are keen to see national land and water bodies used and enjoyed by visitors and Canberra residents alike for a range of recreational uses, however, aim to ensure an appropriate balance between public access to National Land with the protection of national assets.

Icon Water

Managing Director Mr John Knox

Icon Water owns and operates the ACT's network of dams for drinking water, water treatment plants, sewage treatment plants, reservoirs, water and sewage pumping stations, mains and other associated infrastructure. It provides water and sewerage services to the ACT and bulk water to Queanbeyan. Icon Water's interests in healthy catchments include the security, quality and sustainability of water resources for a range of uses, and minimising the impact of our network on the waterways in the region. Queanbeyan — Palerang Regional Council, General-Manager Mr Peter Tegart Yass Valley Council, Director of Planning Mr Chris Berry Snowy Monaro Regional Council, Director of Environmental Services Mr Peter Smith

The local government areas of Queanbeyan—Palerang Regional Council, Snowy Monaro Regional Council and Yass Valley Council all make a significant contribution to the management and protection of the region's natural resources.

Local government is responsible for undertaking a wide range of activities that may impact upon catchment management. This includes the development and implementation of land use planning, managing public land, and regulating private activities. Local government plays a key role in translating the policies of Commonwealth and state governments into local and on-ground projects.

As such their input to strategic planning, economic development and stormwater management is vital to providing the best outcomes for an inter-jurisdictional catchment.

The councils included in the ACT and Region Catchment Strategy were formed on 12 May 2016 to reflect the NSW Government's "Fit for the Future" changes. As a result of these changes, Palerang Council was amalgamated with Queanbeyan City Council, becoming Queanbeyan—Palerang Regional Council and Cooma-Monaro Shire Council was amalgamated with Snowy River Shire Council and Bombala Shire Council to become Snowy Monaro Regional Council.

Acknowledgement of Country

We wish to acknowledge the traditional custodians of the land, the Gundungurra, Ngarigo and Ngunnawal people. The ACT and Region Catchment Strategy seeks to acknowledge and respect the continuing culture and the contribution the Gundungurra, Ngarigo and Ngunnawal people make to the life of this region.

Aboriginal people view rivers, streams and catchments holistically as a part of Country, which is linked to traditional and cultural beliefs that relate to wildlife, lore, and land management.

The rivers form a part of the cultural landscape and are spiritually related to songlines, pathways and ceremony.

River corridors provide travel routes, and also a wide variety of flora and fauna as a readily available food source. It is important that traditional custodians can access rivers and watercourses to teach younger generations about country, dreaming, and future land management.





Executive Summary

The ACT and Region catchment is unique, with multi-jurisdictional influences of federal, state and territory governments together with local government areas across the region.

The ACT Government agreed to establish an inter-jurisdictional coordination body, the ACT and Region Catchment Management Coordination Group (Coordination Group), as a statutory body under the *Water Resources Act 2007* (ACT).

The Coordination Group is an executive-level group formed from the Commonwealth, ACT and NSW (state and local) governments, Icon Water and a community representative and has an Independent Chairperson.

The Coordination Group provides a unique opportunity for government, community and industry to collaborate to achieve the best mix of outcomes to optimise the economic development of the region whilst providing a resilient and liveable environment.

The ACT and Region Catchment Strategy 2016–46 (the Catchment Strategy) covers the entire Murrumbidgee River catchment upstream of Burrinjuck Dam excluding the upper Goodradigbee River in the Tumut local government area (LGA). The strategy covers only the Murrumbidgee catchment component of the Snowy Monaro Regional LGA. It also covers additional lands outside the upper Murrumbidgee catchment to the east (the social catchment) of Queanbeyan–Palerang Regional Council and the Yass Valley LGAs. This is referred to as the **'ACT and Region'**.

Note that the land south-west of the Murrumbidgee River, which was the border for the former Cooma– Monaro Shire Council with the former Snowy River Council LGA, is not incorporated into the Catchment Strategy as it is mostly national parks. However, the implementation of the Catchment Strategy could still extend across to this region on a case-by-case basis where there is opportunity to do so.

The dominant land uses in the region are nature conservation in national parks and reserves and grazing. There are 15 urban settlements of which Canberra/Queanbeyan is the largest with a population of approximately 440,000 people by the end of 2016 and total land area of approximately 16,000 square kilometres for the ACT and Region.

The region is rich in biodiversity and is home to a number of nationally threatened species and ecosystems. The Murrumbidgee River runs through the length of the region and has a number of important tributaries including the Cotter, Molonglo and Queanbeyan rivers.



Bendora Dam

The Coordination Group has been tasked with the development of a regional catchment strategy to drive the implementation and achievement of the vision:

"Government, community and industry working together to produce a healthy, productive, resilient and liveable catchment region."

The Catchment Strategy sets out the principles for governance, describes the key factors that will affect the catchment over the next 30 years and the actions that aim to optimise outcomes for the region.

This strategy will:

- provide a vision to all agencies, organisations and individuals involved in catchment management
- offer a mechanism to resolve jurisdictional challenges and capitalise on the opportunities for improved catchment management outcomes to manage regional growth
- influence and connect to related planning processes
- provide a mechanism to develop joint funding bids and prioritise investment and effort for the benefit of the region, and
- reinforce the connections between land and water, rural and urban and human interaction between people and the environment.



Michelago Creek downstream of the Railway bridge near Michelago Road

Major factors that will shape the catchment over the next 30 years

- The multi-jurisdictional nature of the catchment three levels of government and six jurisdictions.
- A growing population and planning for the associated regional growth – expected to increase by 30% to over 560,000 by 2031. The population of Canberra is expected to increase to over 590,000 by 2047 and the percentage of increase in the NSW local government areas is expected to be in line with this growth.
- A changing climate increased temperatures, change in seasonality of rainfall with an increase in summer and autumn and a decrease in spring, increase in extreme climate events (e.g. drought, wild fire, rainfall intensity).



Canoeing down the Murrumbidgee River

How we will respond to change

The Catchment Strategy sets out our responses to these management challenges and opportunities under five catchment themes. Each theme has a goal and actions with proposed activities to support the actions.

The governance, policy and planning theme

provides a framework for coordination of the policy, planning, investment and knowledge processes that provide a foundation for our work. This theme cuts across the other catchment themes because it relates and intersects with them. It will assist to implement the appropriate actions in a more efficient and effective manner by establishing the processes that are required for a coordinated approach.

The **communities theme** acknowledges the outstanding contribution that catchment groups and volunteer programs play in protecting our natural resources. The actions of this theme seek to harness a growing volunteer base, motivate people to become active in catchment management and increase the community's capacity to adapt and make informed management decisions. Actions aim to change behaviour through community awareness campaigns and education.

The **regional development theme** recognises that the catchment is a growth area and looks to support the prosperity of the region with sound catchment management planning principles and the technical expertise to support sustainable growth in a changing environment.

The **water** and **land and biodiversity themes** support the biophysical processes that maintain the resilience and health of natural resources that are essential for thriving communities and ecosystem services.





Catchment Strategy's 5 themes and 19 actions

GOVERNANCE, POLICY AND PLANNING

GOAL: Governance decisions take into account the values of stakeholders, the evidence base, and the benefits of cross-jurisdictional collaboration, and are undertaken for the collective, long-term good of the catchment and its residents.

Building collaborative relationships

Action 1: Build an inter-jurisdictional decision making framework related to catchment policy and planning.

Action 2: Establish an inter-jurisdictional investment and resourcing framework.

Information and knowledge sharing

Action 3: Promote evidence based decision making for improved healthy catchments.

Action 4: Continue to inform a catchment wide assessment of vulnerability to climate change.

Policy, legislation and plans

Action 5: Review and align catchment management legislation, regulations, policies and compliance to improve consistency.

Action 6: Align enforcement between NSW and the ACT on catchment management practices.

COMMUNITIES

GOAL: The community values and remains strongly connected to the catchment, and has the capacity to quickly adapt to environmental, economic and policy changes.

Adaptability

Action 7: Strategically support the role and work undertaken by peak stakeholder groups, volunteers and land owners and managers.

Action 8: Develop an integrated catchment emergency response plan.

Education and promotion

Action 9: Build community understanding about catchment health to promote behaviour change through a broad range of communication and education strategies.

REGIONAL DEVELOPMENT

GOAL: Human settlement and regional development across the ACT and region is resilient and sustainable.

Settlement patterns

Action 10: Provide an integrated catchment management planning approach for growth and settlement patterns in the ACT and Region.

Infrastructure provision and renewal

Action 11: Develop regional capacity to implement and manage sustainable water infrastructure.

WATER

GOAL: Water is managed in a total water cycle management regime.

Water use

Action 12: Secure long term water supplies for the ACT and Region.

Water quality and aquatic ecosystems

Action 13: Improve water quality, protect and restore aquatic ecosystem health and reduce nutrient, sediment and pathogen loads at key sites across the catchment.

Indigenous and cultural waters

Action 14: Ensure Indigenous and other values are recognised.

Groundwater

Action 15: Develop a better understanding of groundwater resources (quantity and quality) within the region.

LAND AND BIODIVERSITY

GOAL: The ACT and Region is a healthy ecological system that is resilient to stress and adaptive to change.

Biosecurity

Action 16: Implement an approach to biosecurity planning and risk management.

Biodiversity

Action 17: Develop a regional approach to strategic land and biodiversity management practices.

Soil health

Action 18: Mitigate soil erosion at priority sites.

Action 19: Consider regional approaches to dealing with contaminated land, illegal dumping of contaminated waste and dumping of sub-soil construction waste.



Yerrabi Pond



1. The ACT and Region Catchment Management Coordination Group

On 20 October 2014, the ACT Government agreed to the establishment of an inter-jurisdictional statutory body under the *Water Resources Act 2007* (ACT), to be known as the ACT and Region Catchment Management Coordination Group (Coordination Group). The membership for the Coordination Group is provided in Figure 2. The Coordination Group is an executive-level group formed from the Commonwealth, ACT and NSW (state and local) governments, Icon Water and a community representative, with an Independent Chairperson.

The Coordination Group has the function of advising the ACT Minister for the Environment on matters relating to catchment management, with a particular emphasis on:

- regional collaboration and coordination
- alignment of planning, policy and regulatory programs

Actions for the Coordination Group that require intergovernmental agreement between NSW and the ACT governments will be negotiated via the Australian Capital Territory and New South Wales Memorandum of Understanding for Regional Collaboration (the MoU).

The MoU builds on the long history of collaboration between the two jurisdictions and replaces the ACT–NSW Regional Management Framework 2006. It applies to the Australian Capital Territory and the LGAs in South East NSW.

Governance agreements between the National Capital Authority and/or Icon Water will be negotiated on a case by case basis.

Intergovernmental agreements may be used in the future if necessary.





2. The Catchment



A catchment characterisation snapshot of the ACT and Region is provided in this section.

2.1 Geographic area

The ACT and Region, located within the Upper Murrumbidgee Catchment, is unique, with multi-jurisdictional influences of federal, state and territory governments and local government authorities making it a complex catchment to manage.

A number of NSW LGA have undergone administrative and boundary changes since the inception of the Coordination Group. The Catchment Strategy covers the entire Murrumbidgee River catchment upstream of Burrinjuck Dam excluding the upper Goodradigbee River in the Tumut LGA. The strategy covers only the Murrumbidgee catchment component of the Snowy Monaro Regional LGA and also the Queanbeyan–Palerang Regional Council and the Yass Valley LGAs. This is referred to as the **'ACT and Region'**.

The ACT and Region deals with a geographical area that is heavily influenced by urban development and major growth centre in the Murray–Darling Basin.

It is expected that administrative changes will continue to occur over the life of the Catchment Strategy.

The Catchment Strategy will continue to be governed by the Coordination Group and any changes to organisational membership will be effected through amendments to the *Water Resources Act 2007* for ACT Government representatives and amendment to the Water Resources Regulation 2007 which enables appointment by prescription to non ACT Government representatives.



2.2 Catchment facts

The ACT and Region population snapshot and projects is provided in Table 2.

The Australian Capital Territory (ACT)

The ACT is approximately 2358 km² in area.

Whilst the city of Canberra is highly urbanised, about 63% of ACT land area is set aside for conservation in parks and reserves and designated water catchments. Namadgi National Park covers 46% of the Territory. Agriculture is also important and includes sheep, dairy cattle, vineyards and small areas of crops.

The main catchments in the ACT are the Ginninderra, Southern ACT and parts of the Molonglo catchment.

Over 35% of ACT residents live in Ginninderra Creek catchment, making it the most urbanised in the ACT. It carries substantial urban water runoff from both established and newly developing suburbs directly into the Murrumbidgee River.

Ginninderra Creek begins in the upper reaches of Gungahlin within the Mulligans Flat Nature Reserve and enters the Murrumbidgee after passing through the catchment's most significant and best preserved remnant ecosystems; the Ginninderra Gorge.

The Southern ACT catchment is divided into sub-catchments based around seven main rivers/ lake systems in the region which are Murrumbidgee River, Naas River, Gudgenby River, Cotter River, Paddy's River, Lake Tuggeranong and Point Hut Ponds.

The Naas and the Gudgenby river systems originate in the mountains of Namadgi National Park. The Cotter River provides ACT's main drinking supply and flows north adjacent to the Brindabella Range.

Queanbeyan-Palerang Regional Council

Queanbeyan–Palerang Regional Council's LGA covers approximately 5315 km².

One of the main catchments running through the area is the Molonglo catchment. The Molonglo catchment extends from the Murrumbidgee River, just downstream of Uriarra Crossing, to the headwaters of the Molonglo and Queanbeyan rivers and Jerrabomberra Creek across the area formerly referred to as Palerang. This diverse regional council includes the urban areas of Queanbeyan and towns and villages of Captains Flat, Googong, Bungendore and Braidwood. Rural residential areas and farmland including Burra, Royalla and Carwoola and contains the foreshores of Googong Dam, which supplies some of Canberra and Queanbeyan's drinking water.

The headwaters of the Shoalhaven, Molonglo and Yass rivers are located within this regional council. The Shoalhaven ultimately flows into the Sydney basin, while both the Molonglo and Yass rivers are part of the Murrumbidgee catchment.

The Queanbeyan–Palerang economy is a mixture of industries, with the former Palerang LGA predominantly agricultural, with traditional industries such as sheep and cattle grazing predominantly in the central and eastern parts of the shire, and stone fruit orchards in the Araluen valley to the south-east. Private pine plantations are generally located on marginal agricultural land in the north-eastern part of the former Palerang area.

The city of Queanbeyan's employment by industry is made up of a mixture of construction, retail trade, manufacturing and health care and social assistance services.

Snowy Monaro Regional Council

The Snowy Monaro Regional Council land applicable to the Catchment Strategy incorporates the land of the Murrumbidgee catchment component of the Snowy Monaro Regional LGA. As the rest of this region is predominantly national parks, actions that extend to these areas will be treated on a case-by-case basis.

The region comprises the upper Murrumbidgee, Bredbo, Numeralla, Kybeyan and Badja rivers and their respective tributaries.

Landuse in the catchment includes rural (grazing, irrigated and dryland cropping), urban, rural-residential and conservation.

The township of Cooma is situated on the Cooma Creek, with a number of surrounding smaller villages, and rural-residential areas.

The area includes high priority catchments identified by the Actions for Clean Water Plan (ACWA), such as the Numeralla and Bredbo rivers.

Agricultural production in the Cooma Area



Yass Valley LGA

Yass Valley LGA covers approximately 4000 km2. The topography of the region is extremely diverse ranging from the dramatic and beautiful hills, valleys and waterways of the Wee Jasper area to the huge expanse of Burrinjuck Dam.

The Yass Valley Region's major urban centre is Yass, situated on the Yass River. Yass Valley consists of rural residential and villages including Murrumbateman, Gundaroo, Sutton, Bowning and Binalong. Many of its residents commute into Canberra for work.

The region is renowned for its sheep industry and wine production.

Biodiversity, land and soils

The region comprises several physical areas: alpine uplands, tablelands, ranges and lowland slopes. The majority of native vegetation is still intact, with 24% protected in reserves and national parks, mostly in upland areas, although important lowland nature reserves protect grassy woodland and grassland communities.

Human occupation of the region has left its mark over the millennia, with Indigenous fire management modifying and manipulating the natural vegetation structure. With the European settlement of the region from the 1820s significant vegetation clearing occurred, promoted by government policy of the time, causing widespread sheet and gully erosion of readily eroded soils. Significant erosion episodes coincided with droughts followed by floods.

Water

The Murrumbidgee River defines the region with important tributaries in the Numeralla River, Bredbo River, Gudgenby River, Tuggeranong Creek, Cotter River, Molonglo River, Goodradigbee River and the Yass River. The groundwater system features fractured rock aquifers and, while they may be connected to surface catchments, they often cover a much broader area than the surface water catchment.

Water flows in the Upper Murrumbidgee catchment are dominated by dams that regulate the flow of the Murrumbidgee, Cotter, Molonglo and Queanbeyan rivers.

The need to supply drinking water for the growing population of the region dominates the 'water landscape', with numerous water supply dams in the ACT and Queanbeyan water supply network (such as Corin, Bendora, Cotter and Googong dams) and the broader region with the Captains Flat Dam and Yass Dam as well as large dams supplying irrigation and hydro-electric power (Burrinjuck, Tantangara).

Overall surface water quality is good for the region, with localised poor quality reflecting landuse, rainfall events, local erosion and development. Groundwater extraction impacts on the overall water balance of the system, and can be liable to over-extraction, resulting in falling water tables. Contamination of groundwater can also occur from leaking septic tanks. Continuing pressures on water quality will come from increasing intensification in landuse and clearing of native vegetation.

Community

Within the ACT and Region, Canberra has the largest population, followed by Queanbeyan. Employment, higher education opportunities and general services are key drivers of settlement in the ACT and Region. The smaller populations of Cooma experience exceptional population growth in the winter months in support of the tourism industry associated with the snow fields. The ACT and Region has a diverse, multi-cultural population.

The ACT and Region supports a wide range of terrestrial and water-based recreational activities. Recreational sites and facilities feature lakes, rivers, parklands, mountain biking and camping reserves, all of which rely in some way on water.

Volunteering and giving back to the community is strongly entrenched in the ethos of the Australian culture and is carried through into the day to day lives of many living in the ACT and Region.

Most of the region has a higher percentage of volunteering when compared with NSW or Australian statistics.

The Social Expectations Survey of the ACT and Region Waterways conducted by the University of Canberra in 2015 found that understanding of the threats to the water quality is relatively low. Continuing community education and programs addressing behaviour change are critical to future catchment health. It will be essential to engage the community in protecting catchments to increase understanding of the part people play in maintaining healthy catchments and in preventing key pollutants like nutrients from leaves and other organic matter and sediment entering our waterways.

An overview of the survey is provided in Box 1.

Economic development

The ACT and Region has a distinct economic rural and urban split, with the Canberra area dominated by government-related enterprises and the surrounding LGA by rural industries.

Canberra influences the pattern of land use in the surrounding regions with increasing land take for rural residential and satellite towns and villages. There are significant population growth predictions for the ACT and Region, with more than a 30% increase expected in 20 years, especially in the northern part of the Region. Rural residential subdivision and greenfield developments can potentially fragment landholdings and impact negatively on other significant matters such as habitat connectivity and restoration.

Rural residential land use conflict may also arise through noise, odour, farm chemicals, light, visual amenity, dogs, stock damage and weed infestation.

Economic activity measured in gross regional product (GRP) varies greatly across the region. Yass Valley, the former LGA of Cooma–Monaro and Palerang all have a GRP of around \$400 million. The city of Queanbeyan' GRP is \$1.6 billion and the ACT's is \$35 billion.

The survey was undertaken in the third quarter of 2015 and attracted 4,734 responses.

Have **your say** about **water quality** in your **region**

Complete the survey at **www.betterwater.net.au** and go into the prize draw

The University of Canberra is conducting a survey on behalf of the ACT Government and partner organisations looking at how residents living in the region experience their waterways. The survey is supported by the Basin Priority Project which aims to increase the benefits water brings to people living in the region by improving water quality.

🔊 АСТ

Box 1: Social Expectations Survey of Water Use and Water Use Behaviour

The University of Canberra was engaged to conduct a research study on community expectations of ACT and Regional waterways, stormwater issues and factors affecting water quality in the ACT and Region in 2015. This was the Coordination Group's first demonstration of collaboration and capitalising on opportunities to improve catchment knowledge.

Invitation to participate in the survey was mailed to all households across the ACT and Region. Key messages emerging from the survey include:

- Our waterways are well used and highly valued by the community.
- Most people support actions to improve water quality.
- Awareness campaigns are required to change behaviour.
- People are likely to perceive poor water quality in lakes is a problem if they live in the ACT whilst those living in the NSW local government areas are less likely to come to this conclusion.
- Leaf litter or grass clippings going into the stormwater system has the highest rating of causes of water quality problems in the ACT and Region.
- Blue green algal blooms rank below leaf litter or grass clippings as the largest problem for water quality.

Overall, residents of the ACT and surrounding local government areas had views that were relatively consistent with the advice of water scientists regarding signs of poor water quality in the region.

Residents were less likely to recognise leaf litter and grass clippings entering the stormwater system, erosion of stream banks and, to a lesser extent, sewage entering waterways as contributing to poor water quality than water scientists suggest is the case.

As a result of this feedback, the Coordination Group is working to develop a catchment-wide education program that allows residents to better understand how they can minimise their environmental footprint.





3. Major factors that will shape the catchment over the next 30 years

Change is the law of life. And those who look only to the past or present are certain to miss the future. JOHN F. KENNEDY

Research and stakeholder and community consultation indicate that the major factors that will influence the dynamics and condition of the catchment are:

- the multi-jurisdictional nature of the catchment
- a growing population and the associated planning for regional growth
- a changing climate.

3.1 The multi-jurisdictional nature of the catchment

The Catchment Strategy covers a region that is unique in nature in that it is administered by three levels of government³ and six different jurisdictions.⁴ Throughout the consultation phase of the Catchment Strategy, stakeholders often recognised that ecological and hydrological processes operate regardless of political or administrative boundaries.

There have been some excellent examples of cross-border collaboration, such as community and government departments working together on catchment rehabilitation projects such as the Upper Murrumbidgee Actions for Clean Water Plan (ACWA) (refer to Box 11), regional volunteering programs such as Waterwatch and cooperation on emergency management arrangements. Stakeholder consultation also identified a number of opportunities where inter-jurisdictional collaboration could improve.

Research by CSIRO and the Institute for Sustainable Futures on lessons learnt from recent attempts to collaborate will be important for the catchment.⁵ The research highlighted the critical role local governments play in land management practices, but pointed out they are often underresourced and have many competing priorities for their limited funding. This underlines the importance of developing genuine partnerships, with a greater range of stakeholders engaging in the process to manage the catchment.

Table 1 provides an example of how some key inter-jurisdictional legislation, policies and/or plans applies to the catchment themes across the ACT and Region.

Water governance is one of the most critical areas through which to improve the sustainable development of water resources and services. How societies choose to govern their water resources and services has profound impacts on people's livelihood and the sustainability of water resources.

UNITED NATIONS DEVELOPMENT PROGRAMME (2015)⁶

Table 1: Overview of some of the key Commonwealth, state and territory legislation, policies,
plans and programs applicable across the ACT and Region by catchment themes

THEME	ACT	NSW	Commonwealth
Governance	All – AP2, Climate Change Adaptation Strategy	Adapt NSW	Climate Change Adaptation Program - major national vulnerability assessments
Communities	Catchment strategies	UMCCC and joint partners –	
	Catchment Groups	ACWA	
	ACT Heritage Strategy	NSW Heritage Strategy	
Regional development	Planning and Development Act 2007	Environmental Planning and Assessment Act 1979	Murray—Darling Basin Plan
	Territory Plan	SE NSW Growth Strategy	National Capital Plan
	ACT Planning Strategy	Local environmental plans and	
	ACT Waste Management		
	Feasibility Study	CBRJO Regional Waste Strategy	
Water Water Lakes ACT W the Ba EPA En Protec	Water Resources Act 2007	Water Management Act 2000	Water Resources Act 2007 Basin Plan 2012
	Lakes Act 1976	NSW Water Sharing Plan	
	ACT Water Strategy: Striking	NSW Water Compliance Policy	
	the Balance 2014-44	NSW State Groundwater Policy	
	EPA Environmental Protection Policies	Framework Actions for Clean Water Plan	
		Local planning for healthy waterways- using NSW Water Quality Objectives	
Land and	Nature Conservation Act	Nature Vegetation Act 2003	Environment Protection and Biodiversity Conservation Act 1999
Biodiversity	2014	NSW Property Vegetation Plans	
	Nature Conservation Strategy 2012–23	NSW Regional Conservation Plans	
	Pest Plants and Animals Strategy	Dwraft NSW Soils Policy	EPBC Act Policy Statements
	Strategic Bushfire Management Plan		Australia's Biodiversity Conservation Strategy 2010-2030

Googong Dam provides an interesting case study of how an asset in the catchment can be managed by various jurisdictions for the purpose of their own legislation, but result in possible sub-optimal outcomes for the region.

Box 2: Googong Dam Case Study

- Googong Dam was constructed for potable water supply to Canberra (ACT) and Queanbeyan (NSW) in 1979, when population projections at the time showed the three existing dams on the Cotter River would not cope with the predicted demand for potable water.
- Googong Dam is in NSW, approximately 5 kilometres south of Queanbeyan on the lower reaches of the Queanbeyan River.
- Googong Dam is owned by the Commonwealth Government and managed by the ACT Government. The foreshore area is in the NSW local government jurisdictions of Palerang Council and borders the Queanbeyan City Council.
- The *Canberra Water Supply (Googong Dam) Act 1974* was created to facilitate the construction of Googong Dam and allow access of the local utility, Icon Water, to the water resource. The primary purpose of the reservoir is the provision of high quality potable water for the ACT and Queanbeyan.
- In 2008, the Commonwealth leased Googong Dam to the ACT Government for 150 years.
- In 2014, the NSW Department of Primary Industries, under the objects of their relevant legislation, introduced changes to the NSW recreational fishing rules that included expanding recreational fishing in Googong Dam using yabby hoop nets, which has the potential to be inconsistent with the conditions of the lease with the Commonwealth.
- The activity proposes potential risks to potable water quality and associated health threats; it increases the chance for pathogenic contamination in potable water and may cause Icon Water to undertake additional treatment costs.
- ACT and NSW governments are now working collaboratively to identify the risks of using yabby hoop nets on potable water supply and identify options. A collaborative cross- border risk assessment workshop was carried out and determined that yabbying could continue to be permitted and monitored in Googong Dam with additional controls brought into place to manage increasing visitor numbers due to the nearest community of permanent residents. Continual monitoring and evaluation will be carried out.
- The Coordination Group, which did not exist at the time, now provides a forum where jurisdictions can assess possible conflicts in legislation, policy and planning and develop policy options that maximise the interests of all stakeholders.



Googong Dam spillway December 2010



Ginninderra College waters edge

Sustained population growth, continued economic interdependencies and the complex issues of service delivery have given rise to a new set of relationship drivers within the broader South East Region. Promoting targeted service delivery, sustainable regional growth and future economic prospects offered by infrastructure investments are important priorities for both jurisdictions. ACT AND NSW MOU FOR REGIONAL COLLABORATION (2011).

3.2 A growing population and planning for regional growth

The ACT and Region is the largest inland urban area in Australia. The region's population is continually growing (Table 2).⁷ There is common agreement that most of this growth will be focused on Canberra and the commuting belt stretching from the northern parts of Yass, around to Bungendore and continuing into areas immediately south of Queanbeyan. The establishment of the National Capital shifted the predominant rural employment base to construction, retail and commercial activities to service the rapid post World War 2 population growth in the region. Public service growth in Canberra became a dominant employment sector, and is mirrored in regional centres where state and local government employment reflects the service centre nature of the region.

Heavy industry is not a significant sector in the region although a growing proportion of the population is now employed in a diversifying private sector, which services the public sector as well as providing services and products with a distinctive regional character. Echoing this diversification is the growth in the tourism, leisure and entertainment sectors, reflecting the rise in local and international interest to the region.

There are significant planning implications to provide for population growth and this is considered in the catchment themes. In summary this includes:

- security of a safe and affordable water supply
- wastewater and sewage management
- other impacts on water quality arising from increased urban development
- fragmentation of land and habitat
- regional waste management.

Community consultation on population growth

Population growth has both positive and negative connotations. Community consultation noted that an increased population could augment the region's already significant volunteer base in natural resource management. Increased population also potentially provides for greater economies of scale to develop infrastructure and manage water quality assets. The obvious risk associated with population growth is providing area for development while minimising the ecological footprint. Sustainable population growth and considering the region's carrying capacity was mentioned during consultation. Therefore, the Catchment Strategy seeks to capitalise on the opportunities provided by a growing population and minimise potential negative catchment impacts.
Area	Total population 2011	Projected total population to 2031	Projection of change (%)	Annual change (%)	Quick facts of population profile	
ACT	357,222	453,300	26.90%	1.34	The growing population will require approximately 65,000 additional dwellings between 2006 and 2030 ^b .	
Queanbeyan – Palerang Regional Council	52,343	79,050	51.02%	2.6	By 2031 is planning to accommodate 10,000 new dwellings, largely in the Googong area ^c . Between the 2001 and 2011 censuses, population growth in Bungendore increased by 76.3% and the Carwoola-Burra and district increased by 61.5% ^e .	
Yass Valley LGA	15,020	21,900	45.81%	2.29	There was a significant increase in population between the 2001 to 2006 census. Villages like Murrumbateman increased by 38.29% in that period ^d .	
Snowy Monaro LGA (former Cooma- Monaro LGA data)	9,772	10,750	10%	0.50	The former Cooma-Monaro LGA is predicted to have an annual growth change of 0.5%.	
	434,352	565,000	30%			
*Note: the Conference projection was far the period 2012-2022 and NSW projections for 2011-2021						

Table 2: Population data for the ACT and Region and Projected Total Population(Source: ABS 2011 Census data; ACT and NSW Government data projections.Note: The following projections were calculated on the existing LGA prior to the 12 May 2016 changes)^a

*Note: the Canberra projection was for the period 2012–2032 and NSW projections for 2011–2031

a NSW Department of Planning (2014), New South Wales State and Local Government Area Population Projections: 2014 Final and ACT Planning Strategy.

b ACT Planning Strategy, Background paper no 9.

c Queanbeyan City Council (2006), Economic and Residential Strategy 2006-2031, p6.

d Yass Valley Council (2010), Town and Villages Study 2010-2031, http://www.yassvalley.nsw.gov.au/sites/yassvalley/files/public/images/documents/yassvalley/ Strategic%20Planning/DOP_endorse_copy.pdf.

e Palerang Council (2015), Palerang Rural Lands Study, http://www.palerang.nsw.gov.au/sites/palerang/files/public/images/documents/palerang/current/Positions%20vacant/2015/Palerang%20Rural%20Lands%20Study%20Report.pdf.

Scientific evidence tells us that increasing levels of greenhouse gases in the earth's atmosphere are having a profound effect on our climate and oceans and the Earth's ecological systems.

AP2, ACT GOVERNMENT (2012)



3.3 A changing climate

The ACT and NSW governments are cooperating on the development of regional climate modelling to provide fine-scale climate projections for south-east Australia as part of the NSW and ACT Regional Climate Model project (NARCliM).

The project has improved the ability to predict changes in temperature, wind and rainfall which, in turn, will provide critical information to manage the impacts of climate change on health, settlements, agriculture, tourism and services such as water and energy supplies.



Box 3: Key pressures of climate change impacts

Climate projection snapshot

There are separate NARCliM⁸ reports for the ACT and the South East and Tablelands planning region, which stretches from the south-east coast inland to Young. Both reports concluded:

- the number of hot days over 35°C will increase by approx. 1–5 days by 2030 and by 10 days by 2070
- the number of cold nights (minimum temperatures below 2°C) will decrease by approximately 13 by 2030 and 43 by 2070
- annual rainfall will remain similar, but will increase in summer and autumn and decrease in spring
- the number of severe fire weather days will increase in summer and spring
- 2030 maximum temperatures are predicted to increase, with NSW showing a 0.1°C larger increase
- 2030 and 2070 minimum temperatures are predicted to rise by the same range in both jurisdictions: by 0.4–0.7°C in 2030 and by 1.4–2.3°C in 2070.

Climate change has the potential to impact on the ACT and Region:

- Increase in frequency of extreme events such as droughts, wildfire, floods and extreme temperatures will impact on human settlements and health. It has the potential for disruptive changes on the catchment
- Reduced rainfall and changed rainfall patterns may threaten water supply and affect natural cyclic processes.
- Species shift their home ranges.
- Some species that lack the capacity to adapt may become locally extinct.
- Invasive species may expand their range and create new challenges for management of pest plants and animals.
- Loss of soil cover and increased risk of erosion are likely.

A number of climate change related actions are incorporated across the catchment themes.



Street flooding in Belconnen in 2014

Stor .

4. The Catchment Strategy

4.1 Purpose

The Catchment Strategy sets out the principles for governance, describes the key factors that will affect the catchment over the next 30 years and the actions that aim to optimise outcomes for the region.

This strategy will:

- provide a vision to all agencies, organisations and individuals involved in catchment management
- offer a mechanism to resolve jurisdictional challenges and capitalise on the opportunities for improved catchment management outcomes to manage regional growth
- influence and connect to related planning processes
- provide a mechanism to develop joint funding bids and prioritise investment and effort for the benefit of the region and
- reinforce the connections between land and water, rural and urban and interaction between humans and the environment.

4.2 Developing the Catchment Strategy

The Catchment Strategy has been developed with strong involvement from a wide range of stakeholders in the catchment. Figure 5 provides a brief overview of the consultation process.

Considerable consultation went into the development of the Catchment Strategy. Stakeholders were extensively consulted in developing the draft Strategy, and a six week formal consultation was conducted on the draft Strategy. The Coordination Group have also sought their own organisations' endorsement of the Strategy.

Consultation and engagement was designed to ensure key stakeholders including government, community and industry representatives were informed, engaged and provided with a process for a robust and wide-ranging community discussion to inform the drafting and finalisation of the Catchment Strategy.

Greater detail on the consultation process is provided in Appendix A.

Table 3 provides an overview of the consultative groups in the consultation and engagement process.



ACT and Region Catchment Management Coordination Group

Table 3: Consultation Mechanisms

Groups	Role			
Catchment Strategy Working Group	The Coordination Group agreed to the establishment of an officer level working group to oversee the preparation of a draft Catchment Strategy for public consultation and final Catchment Strategy.			
Representative Stakeholders/ Community Workshops	A stakeholder meeting was held in July 2015 to agree on a draft general structure of the overall Catchment Strategy and the process for broader stakeholder consultation. Three regional workshops were held in Murrumbateman, Cooma and Queanbeyan during September 2015. The workshops used a World Cafe format where participants (except in Cooma) worked through in rotation the five catchment themes for the Catchment Strategy and provided their thoughts and ideas. It also clarified issues to be addressed.			
Targeted Stakeholder Interviews and Consultation	Throughout the drafting of the Catchment Strategy, targeted stakeholder interviews and follow up conversations occurred. Catchment themes workshops were held with technical and community experts. An overview of the Catchment Strategy was presented to the UMCCC Forum in March 2016. Note that during public consultation release of the draft Catchment Strategy, numerous targeted consultations occurred with NSW Government departments an community stakeholder groups as well. Targeted consultation will continue over the lifetime of the Catchment Strategy.			
Public consultation workshops	Following the release of the draft strategy, the UMCCC and the Australian Water Association co-hosted two public consultation workshops, attended by over 50 people.			



Pine Island

Figure 5: Stakeholder Consultation Diagram





5. Catchment Themes



Scrivener Dam

5.1 Introduction to catchment themes

The five catchment themes have been developed to frame the social, economic and environmental responses to the catchment challenges. The themes are not in hierarchal order. They provide goals, and a number of actions with proposed activities and cover the functional areas of:

- Governance, policy and planning
- Communities
- Regional development
- Water
- Land and biodiversity.

The **governance**, **policy and planning theme** provides a framework for coordination of the policy, planning, investment and knowledge processes that are the foundation to the Catchment Strategy and the Coordination Group operation.

The **communities theme** acknowledges the outstanding contribution that numerous catchment groups and volunteer programs play in protecting our natural resources. The actions of this theme seek to harness a growing population by motivating people to become active in catchment management and increasing the community's capacity to adapt. It identifies the importance of education and community awareness.

The **regional development theme** recognises that the catchment is experiencing population growth and looks to support the prosperity of the region with sound catchment management planning principles and the technical expertise to support sustainable growth in a changing environment.

The **water** and **land and biodiversity themes** support the biophysical processes that maintain the resilience and health of natural resources that are essential for thriving communities and ecosystem services.

Section 5.2 provides a summary of the five catchment themes and actions.

NOTE: The Catchment Action Implementation Plan provides further details on the likely activities that would be carried out to support the actions. The following pages provide a summary of the activities with each action.

5.2 Summary of the Catchment Strategy's 5 themes and 19 actions

GOVERNANCE, POLICY AND PLANNING

GOAL: Governance decisions take into account the values of stakeholders, the evidence base, and the benefits of cross-jurisdictional collaboration, and are undertaken for the collective, long-term good of the catchment and its residents.

Building collaborative relationships

Action 1: Build an inter-jurisdictional decision making framework related to catchment policy and planning.

Action 2: Establish an inter-jurisdictional investment and resourcing framework.

Information and knowledge sharing

Action 3: Promote evidence based decision making for improved healthy catchments.

Action 4: Continue to inform a catchment wide assessment of vulnerability to climate change.

Policy, legislation and plans

Action 5: Review and align catchment management legislation, regulations, policies and compliance to improve consistency.

Action 6: Align enforcement between NSW and the ACT on catchment management practices.

COMMUNITIES

GOAL: The community values and remains strongly connected to the catchment, and has the capacity to quickly adapt to environmental, economic and policy changes.

Adaptability

Action 7: Strategically support the role and work undertaken by peak stakeholder groups, volunteers and land owners and managers.

Action 8: Develop an integrated catchment emergency response plan.

Education and promotion

Action 9: Build community understanding about catchment health to promote behaviour change through a broad range of communication and education strategies.

REGIONAL DEVELOPMENT

GOAL: Human settlement and regional development across the ACT and Region is resilient and sustainable.

Settlement patterns

Action 10: Provide an integrated catchment management planning approach for growth and settlement patterns in the ACT and Region.

Infrastructure provision and renewal

Action 11: Develop regional capacity to implement and manage sustainable water infrastructure.

WATER

GOAL: Water is managed in a total water cycle management regime.

Water use

Action 12: Secure long term water supplies for the ACT and Region.

Water quality and aquatic ecosystems

Action 13: Improve water quality, protect and restore aquatic ecosystem health and reduce nutrient, sediment and pathogen loads at key sites across the catchment.

Indigenous and cultural waters

Action 14: Ensure Indigenous and other values are recognised.

Groundwater

Action 15: Develop a better understanding of groundwater resources (quantity and quality) within the region.

LAND AND BIODIVERSITY

GOAL: The ACT and Region is a healthy ecological system that is resilient to stress and adaptive to change.

Biosecurity

Action 16: Implement an approach to biosecurity planning and risk management.

Biodiversity

Action 17: Develop a regional approach to strategic land and biodiversity management practices.

Soil health

Action 18: Mitigate soil erosion at priority sites.

Action 19: Consider regional approaches to dealing with contaminated land, illegal dumping of contaminated waste and dumping of sub-soil construction waste.



Scottdale Reserve along the Murrumbidgee River

5.3 Theme: Governance, policy and planning

GOAL: Decisions take into account the values of stakeholders, the evidence base, and the benefits of cross-jurisdictional collaboration, and are undertaken for the collective, long-term good of the catchment and its residents.

Box 4: Summary of governance factors

- There is evidence of divergence in how jurisdictions apply their legislation, to the possible detriment of the catchment.
- Under-resourcing of programs such as educational campaigns or compliance enforcement could have negative consequences for catchment management.
- Confusion of roles and responsibilities of governments, community groups and peak stakeholder groups may lead to duplication of effort or missed opportunities.
- The large number of legislation, regulations, policies, plans and strategies related to catchment management can cause confusion in their application and the relationship between these documents.
- Poor data management and monitoring on biophysical catchment condition means decisions may not be based on best available information.

Log jams on Murrumbidgee River downstream of Tharwa



The governance, policy and planning theme cuts across the four catchments themes and will assist to implement the appropriate actions in a more efficient and effective manner.

Actions related to this theme have been developed around improving governance, policy and planning in catchment management and are aimed at:

- collaborative relationships
- information and knowledge sharing
- aligning relevant legislation, policies and plans to minimise the risk of perverse outcomes
- involving the three levels of government and key stakeholders in collaborative decision making processes
- providing a framework that provides a 'best for region' approach to decision making.



Building collaborative relationships

Building collaborative relationships refers to the organisational structures and relationships between the many organisations (including community) with an interest in catchment management.

The Catchment Strategy seeks to build on sharing and understanding of knowledge of each other's activities, building trust, and working collaboratively towards common catchment management goals.

Action 1: Build an inter-jurisdictional decision making framework related to catchment policy and planning.

Activity summary

» Build a collaborative framework for decision making at the appropriate level

What does this mean?

The framework will set out parameters and principles to identify future decision making on projects and policy decisions at the appropriate scale. It will clarify roles and responsibilities so people can understand who makes decisions and at what level and will include the roles and responsibilities of community, industry and government.

Action 2: Establish an inter-jurisdictional investment and resourcing framework. Activity summary

» Develop a strategy for ongoing resourcing of agreed priority actions

What does this mean?

The framework will provide principles and parameters of when the Coordination Group will co-invest, align, collaborate and cost share in resourcing activities for improved catchment management. This action is also related to Action 1.

Information and knowledge management

Access to current information and knowledge is essential for informed decision making. One of the pillars of good governance is having the best available information readily accessible to support decision making processes.

Different organisations house and collect data in different ways and at different scales. Furthermore, catchment management information is not readily accessible to many stakeholders including government.

The Coordination Group sees the benefits of a more connected approach to data collection, management and dissemination. While the catchment has been well studied in many respects, there has been little coordination of studies across jurisdictions and no central access point to facilitate learning from previous work. Improved knowledge management can help to align priorities to manage threats to the catchment, align reporting cycles, make informed decisions about land management and identify data and information gaps.

Action 3: Promote evidence based decision making for improved healthy catchments. Activities summary

- » Develop a knowledge and information management strategy
- » Implement a cross-jurisdictional catchment monitoring program
- » Establish an advisory group to support access to, and build capacity form ideas and innovation

What does this mean?

The Coordination Group will investigate a data and knowledge management approach that provide cost-effective and pragmatic options for data capture, dissemination and acquisition.

Evidence-based decision making will be informed by cross-jurisdictional monitoring and reporting programs on catchment attributes/biophysical parameters such as water quality, land and biodiversity condition and soil health and be informed by past experience through information and knowledge sharing from community, industry and government.



Establishing an advisory group from community, industry and government that will allow for capacity building and a place to share ideas is seen as an effective way for transfer of information and knowledge sharing. This may include partnerships with research organisations.

Action 4: Continue to inform a catchment wide assessment of vulnerability to climate change.

Activity summary

» Build on existing work on vulnerability assessment to climate change

What does this mean?

Vulnerabilities of the catchment relating to climate change will be identified through a gap analysis and extend from existing work completed to date and will inform and influence future catchment activities such as mitigation activities related to improved biodiversity, better land management practices and preparedness planning. This will include applying the precautionary principle approach to managing the uncertainty surrounding climate change impacts.

Policy and planning

This Catchment Strategy and the establishment of the Coordination Group provides an unique opportunity to align legislation, regulations, policies, plans and strategies relating to catchment management across jurisdictions.

Likewise, jurisdictions in the ACT and Region may not have complementary policies and plans that promote good catchment management. The Catchment Strategy seeks to identify these policies and plans and prioritise the filling of gaps.

The Catchment Strategy will also seek to align catchment targets and indicators across the jurisdictions.

Action 5: Review and align catchment management legislation, regulations, policies and compliance to improve consistency. Activities summary

- » Develop agreed catchment targets (biophysical and social) and/or key performance indicators for catchment health
- Undertake an audit of relevant legislation, policy and plans and prioritise a review and alignment program to identify conflicts and/ or inconsistencies

What does this mean?

Investigating existing and new catchment targets and/or key performance indicators, whichever is the more appropriate, allows jurisdictions to assess actions or decisions towards better catchment health and provides an indication of the level of change required to maintain catchment health.

Catchment management legislation, regulations, policies and compliance will be prioritised in a critical review to ensure they do not adversely impact on each other and to assess any information gaps, including where certain jurisdictions may not have complementary documents.

Action 6: Align enforcement between NSW and the ACT on catchment management practices. Activities summary

- » Combine and coordinate enforcement and compliance programs
- » Update compliance guidelines

What does this mean?

Coordination of programs will assist in conveying consistent messages across jurisdictions and allow for better use of resources including better service delivery to the community. Programs may include regional waste management approaches through illegal dumping compliance campaigns or educational awareness campaigns on harmful catchment health activities.

Aligning compliance and enforcement regulation where practical will require the guidelines to be regularly updated to adapt to the region.

5.4 Theme: Communities

GOAL: The community values and remains strongly connected to the catchment, and has the capacity to quickly adapt to environmental, economic and policy changes.

Box 5: Summary of communities factors

- Increasing population, and higher than national average volunteerism rates, provides an opportunity for greater involvement in natural resource management; however, resourcing and capacity constraints need to be addressed.
- The ACT and Region continues to be recognised as a significant meeting place for Indigenous people. The National Capital is a meeting place for Indigenous people from across Australia and the Torres Strait. Recognition and incorporation of Indigenous cultural and land management practices is important for transferring knowledge and increasing cultural awareness. The ACT and Region covers three Indigenous countries of the Gundungurra, Ngarigo and Ngunnawal people.
- The community needs to be able to adapt to changing circumstances, particularly climate.



Alan and Marj Jones waterwatching at Scottsdale May 2015

The ACT and Region has faced a number of significant extreme events, including the Millennium Drought, floods and fires. The Queanbeyan flood and the Canberra floods of the 1970s and the Canberra bushfires of 2003 led to loss of life and property. At the other end of the spectrum, the region has been undergoing smaller changes that have cumulative impacts over time such as population growth, land use change and urbanisation.

Responding to extreme events, population growth and land use changes requires community resilience in catchment management to continue to be strengthened. The response is aimed at:

- being prepared for the pace of continual change, whether predicted or otherwise through awareness raising, education and promotion strategies
- taking a broad view of potential change, taking into consideration the actual physical places where people live and the different demographic and cultural groups that make up those places. We also include the organisations, institutions and governments that interact with the communities of the catchment, and the relationships between them
- improving adaptive capacity where personal and collective knowledge about the possible risks can be managed through the social networks and institutional arrangements that either support or impede change.

Adaptability

The actions under this theme are intended to support communities to adapt to changes that can be predicted with reasonable accuracy. Community capacity building starts by supporting the work that is currently undertaken by volunteers, peak stakeholder groups, land owners and land mangers. It relates to a transfer of catchment knowledge and information from people and organisations. This can be done through having engaged communities and the appropriate communication networks. A resilient community is able to adapt itself to maintain function. This theme is focused primarily on human communities. This theme is focused primarily on human communities including our indigenous heritage.

There are clear linkages to the Australian Government's Climate Change Adaptation Program—major national vulnerability assessments; the NSW Government's Adapt NSW and ACT Government's climate change adaptation strategy. Adaptability for other species is addressed in the land and biodiversity and water themes.

Action 7: Strategically support the role and work undertaken by peak stakeholder groups, volunteers and land owners and managers. Activities summary

- » Develop community leaders and catchment managers including landholders
- » Resource and co-invest in organisations, regional forums and groups
- » Work with peak bodies to encourage sound catchment management practices

What does this mean?

The Catchment Strategy will seek to develop and enhance community capacity and knowledge transfer by developing emerging community catchment leaders and catchment managers including landholders and land managers such as our Indigenous managers through forums, studies, collaboration, programs etc. Supporting existing community and industry networks that play a vital role in the dissemination of information and bringing together of experts through peak bodies and end-users in the development of catchment management practice. This links back to Action 2 of developing an inter-jurisdictional investment and resourcing framework, where the principles and factors will determine when to co-invest, align and collaborate in catchment management activities.

Continuing to recognise and support existing volunteers through improved skills development and providing the tools to implement better catchment management practices

Working with peak bodies reduces the chances of industry conflict and helps catchment enterprises to be managed sustainably. Existing networks and peak bodies will be supported and utilised wherever possible to encourage sound catchment management practice.

Education and promotion

The Social Expectations Survey of the ACT and Region Waterways conducted by the University of Canberra in 2015 (refer to Appendix A), which provided an insight into social attitudes and values relating to water management in the region, found that understanding of catchment processes by the wider community is relatively low. Therefore it is important to build capacity and community understanding to strengthen skills, competencies and abilities of people and communities to the benefits of good catchment health.

Consultation emphasised the importance of community education and the need for continuing programs or workshops on a regular basis. There is a major opportunity to coordinate the work of existing stakeholders and deliver an integrated package of programs with greater reach and effectiveness than currently.

Education and behavioural change programs are critical to improving catchment management.



Yass River

I love a sunburnt country, A land of sweeping plains, Of ragged mountain ranges, Of droughts and flooding rains. I love her far horizons, I love her jewel-sea, Her beauty and her terror– The wide brown land for me! MY COUNTRY, DOROTHEA MACKELLAR, 1908

Action 8: Develop an integrated catchment emergency response plan. Activity summary

» Develop integrated plan which combines material from all levels of government, existing programs and community knowledge on pre and post emergency responses to catchment management

What does this mean?

An integrated catchment emergency response plan focuses on how we can better manage our catchments to be prepared for natural disasters and emergency events. This includes how we care for our catchments following events like bushfire by ensuring we have seedling stock or seed banks to allow for re-vegetation or, in severe storm events, ensuring we can better manage flows through catchments. Action 9: Build community understanding about catchment health to promote behaviour change through a broad range of communication and education strategies.

Activities summary

- >> Urban and peri urban catchment wide advisory programs and campaigns focused on education
- Educate recreational users of sensitive use of waterways and supply catchments

What does this mean?

The community's catchment literacy and understanding will be strengthened through the enhancement of skills and abilities. Targeted campaigns will be developed to promote catchment health and behavioural change such as educating landowners that their actions on their block or in their community may have impacts on other parts of the catchment, and increasing the community's understanding of catchment management information.

The Catchment Strategy will also work with industry groups to develop and promote 'industry best practice' to minimise our ecological footprint and provide this information through our programs and campaigns.

The action also involves raising awareness of the impact of poor behaviour on sensitive catchment areas such as our waterways and drinking supply catchments.

5.5 Theme: Regional development

GOAL: Make human settlement across the ACT and Region resilient and sustainable and ensure that human impacts on downstream catchments are minimised

Box 6: Summary of regional development factors

- Projected 30% population growth rates for the ACT and Region to 2031.
- Water supply security is variable across the region.
- Expanding urbanised areas will increase nutrient and sediment loads, particularly via run-off from impervious surfaces.⁹
- Ageing infrastructure has been identified in the region such as through the Yass Valley Council's, Resourcing Strategy 2013–2017¹⁰ and other council documents for the former council areas of Queanbeyan, Palerang and Cooma–Monaro.
- Wastewater and sewage management capacity will continue to be a challenge for a growing region. Reticulated sewerage treatment can be a constraint for rural villages across the catchment.
- Inter-jurisdictional discussions are currently underway for sewage treatment for Queanbeyan; in the past, outflows have negatively impacted on water flowing from the Molonglo River discharging into Lake Burley Griffin. See Box 7.
- The Captains Flat Sewage Treatment Plant in the Molonglo catchment exceeded the pollutant volume limit on five occasions during 2005–06 and 19 days in 2006–07.
- Total domestic waste will increase with an increasing population.
- Other aspects considered to be challenges include the view that catchment management is seen as a cost to government and development by some sections. Insufficient valuing of ecosystem services presents a distorted budgetary position.

New infrastructure and renewal of infrastructure will need to cope with a range of different climatic conditions and extreme weather events. Increased intensity of storm events will place pressure on the stormwater network, and will have implications for water quality downstream.¹¹

This theme strives to underpin the 'liveability' component of our vision by recognising the importance of two key areas to economic prosperity; the provision of appropriate catchment-related infrastructure and sustainable patterns of settlements.

While these are not the only contributors to economic growth, they are interrelated and have significant regional collaboration implications.

Regional development for the ACT and Region that takes into account catchment management is aimed at:

- assisting a range of settlement patterns (e.g. greenfield, urban renewal, village renewal and peri-urban) to minimise their footprint on the catchment. Infilling of existing settlements will mitigate further fragmentation of land and expansion of service infrastructure
- ensuring the design and construction of significant infrastructure takes into consideration cross-border collaboration (where appropriate) and the opportunity to increase environmental standards and sustainability outcomes.

The costs of operation and maintenance of ageing infrastructure was repeatedly raised during consultation, with many identifying the importance of developing innovative funding models, partnerships and designs to meet the catchment's needs.

Box 7: Queanbeyan – Palerang Regional Council and Icon Water 'Best for Region' Project

The Queanbeyan–Palerang Regional Council Sewage Treatment Plant (STP) is approximately 80 years old and at full capacity. The plant is located in the ACT and is subject to an ACT environmental discharge licence. Flows from the plant pass down the Molonglo River before entering Lake Burley Griffin.

The plant is a significant source of nutrients (phosphorous and nitrogen) entering Lake Burley Griffin, and the 2012 Taskforce Report on Lake Burley Griffin by the Commissioner for Sustainability and the Environment recommended a review and update of the environmental authorisation for the plant.

Following initial master planning by the former Queanbeyan City Council which focused on rebuilding and upgrading the Queanbeyan STP on the current site, discussions at the ACT and Region Catchment Management Coordination Group highlighted the potential benefits of an integrated regional option.

The regional council and Icon Water have been jointly investigating a 'Best for Region' sewage management solution for the city of Queanbeyan and ACT Government. To progress development of the solution, they are working together to develop a governance framework, operating protocols and a roadmap for implementation.

A coordinated approach has the potential to provide a more cost-effective infrastructure arrangement with greater economies of scale. This will lead to potentially lower unit costs to the respective customers and makes a sewage treatment plant with higher environment standards more cost efficient and achievable.

A coordinated option would assist in reducing nutrient loads and the associated blue green algae risk to Lake Burley Griffin and downstream in the Murrumbidgee River.



Queanbeyan Sewage Treatment Plant



What is the most sustainable way to accommodate a projected 30% increase in population by 2031? This is a question for all levels of society and government. Under the ACT Planning Strategy (2012), greenfield housing development is focused on smaller lots and higher yield of blocks while urban renewal and intensification projects have been identified in established areas in Canberra. The demand for peri-urban settlement in the region surrounding Canberra is also evident with the surrounding NSW councils of Queanbeyan– Palerang, Snowy Monaro and Yass Valley planning for increases in rural residential and greenfield developments as identified in the region's various residential studies and growth plans.

Canberra provides significant services for the region, especially in terms of health care, education and transport. Canberra also influences the pattern of land use in the surrounding regions with increasing land take for rural residential and satellite towns and villages. This can be seen as providing both opportunities and constraints for social, environmental and economic indicators.

Rural lifestyle landowners often occupy periurban areas, the non-urban landscape close to urban or regional centres. These landowners do not derive their living directly from their properties; rather, it is a lifestyle choice.¹³

A study carried out by the Upper Murrumbidgee Catchment Coordinating Committee (UMCCC) on peri-urban land management found that rural lifestyle landowners often have limited time and capacity to respond to catchment issues, such as weeds, on their properties. This will be addressed in greater detail in Catchment Theme: Land and Biodiversity. Action 10: Provide an integrated catchment management planning approach for growth and settlement patterns in the ACT and Region. Activities summary

- » Develop agreed cross-border catchment planning principles
- » Continued cooperation for regional waste management

What does this mean?

The Catchment Strategy seeks to underpin the development of new and renewed settlements with integrated catchment management principles. The Coordination Group will investigate cohesive catchment planning principles to be incorporated into respective detailed planning documents such as development control plans and development codes and planning strategies to consider the onsite and downstream impacts of development on our catchment health. Developing catchment planning principles that work together ensures planning and development is not carried out in a siloed approach and considers the impacts across the catchment irrespective of jurisdictional boundaries.

The Coordination Group will promote approaches to waste management and recycling and other options to reduce our ecological footprint in a regional approach through the CBR Joint Region process including identification of sites suitable for reprocessing a larger regional waste stream.

In conjunction with the Regional Waste Management Strategy, the ACT Government is engaging with the community on the ACT Waste Feasibility Study. This whole-of-government program is looking at improving waste management and meeting the ACT Government's waste policy targets, including achieving over 90% resource recovery by 2025 and a carbon neutral waste sector by 2020. The feasibility study includes a review of the existing waste strategy, auditing and improving waste data, implementing new waste legislation and planning for the future of waste infrastructure. There is an opportunity to delve into the knowledge, findings and information that will come out of this process across the ACT and Region.

Box 8: 'Improving long-term water quality in the ACT and Murrumbidgee River system'

On 3 July 2008 the Commonwealth and the Murray–Darling Basin States signed an Intergovernmental Agreement on Murray–Darling Basin Reforms. The agreement provides for projects that will substantially contribute to the overall health of the Murray–Darling Basin.

In February 2014, the Australian and ACT governments signed a funding agreement for the Basin Priority Project, 'Improving long-term water quality in the ACT and Murrumbidgee River system'. Commonwealth funding of \$85 million and an ACT Government contribution of \$8.5 million has been approved.

The project is expected to improve water quality and river health in Canberra's lakes and waterways and have significant downstream benefits in the Murray–Darling Basin by reducing the level of nutrients and other pollutants flowing into the Murrumbidgee River and downstream.

The project will deliver infrastructure interventions for six priority catchments. Interventions reflect different catchment scenarios such as a developed urbanised catchment, a semi-rural catchment, an industrial catchment and greenfield developments.

The project is being delivered via a two-phase process, with Phase 2 to be completed by March 2019.

Deliverables for the first phase included implementing a comprehensive water quality monitoring program, undertaking a review, audit and analysis of existing water quality infrastructure and its performance and assessing a range of potential water quality interventions.

Key findings from Phase 1:

- Assessment of water quality has confirmed that increasing pollutant loads in run-off remains a key
 water quality issue for the ACT. The construction of impervious surfaces (i.e. roads and roofs) leads
 to significantly increased volumes of run-off in the order of three to six times greater than run-off
 from impervious surfaces depending on the extent and nature of development, when compared to
 a rural pre-developed catchment.
- Stormwater system design has focused on moving stormwater as efficiently as possible from catchments to the receiving water body, either a river system or urban lake. Urban lakes represent an end-of-pipe treatment approach that has proven effective in trapping pollutants (in many cases) but the resultant water quality is inconsistent with the amenity values the community now seeks from them. Excessive nutrients (phosphorous and nitrogen) lead to cumulative conditions for algal bloom outbreaks. Sediments also accumulate as a result of soil erosion, leading to degraded physical water properties as well as altered biochemical conditions.

Phase 2 of the Basin Priority Project will involve the construction of water quality interventions capable of delivering substantial water quality improvements in priority catchments.



Yarralumla Creek, upstream of Cotter Road bridge



Infrastructure provision and renewal

Infrastructure provides the physical and organisational structures and facilities needed for the operation of the ACT and Region.

Centralised systems of infrastructure, whether municipal or trunk infrastructure, have high capital and running costs. Many systems were designed in the previous century when our values and knowledge about the environment were quite different, they serviced a smaller population, or were designed and constructed for other purposes. A rethink on how infrastructure is constructed and its purpose has the potential to provide users with more efficient and costeffective service delivery as well as delivering assets that have higher environmental performance standards.

The ACT and Australian Governments have agreed to invest up to \$93.5 million in water quality infrastructure to improve the condition of Canberra lakes and waterways and the Murrumbidgee River leaving the ACT. Box 8 provides an overview of the project, referred to as 'Improving long term water quality in the ACT and Murrumbidgee River system.'

There is also potential to become a leader in this water quality infrastructure and monitoring field and this will be pivotal in promoting living (green) infrastructure (Box 9) across the region as development occurs and has significant commercial opportunities at a broader scale.

Action 11: Develop regional capacity to implement and manage sustainable water infrastructure.

Activities summary

- » Endorse the adoption of living (green) infrastructure
- Assess the adequacy of water and sewerage infrastructure and identify renewal and replacement options
- » Trial further WSUD projects across the region
- » Assist industry through guidelines, partnered projects and incentives to implement WSUD
- » Develop regional technical capacity

What does this mean?

Planning for living infrastructure for urban and rural areas will encourage ecological principles across the catchment, enhance landscape connectivity and climate refuges and ameliorate the heat island effect in urban areas.

The Catchment Strategy will also allow for assessing the viability of regional water and sewerage infrastructure to provide cost-effective options for service delivery to end users and allow the achievement of higher environmental standards in the surrounding NSW councils.

Water sensitive urban design is seen as a practice that the region could benefit from in building its capacity within government, industry and the community regardless of borders. This can be done through the trial of infrastructure projects and also the sharing of information through developing some form of community of practice to develop the region's technical capacity for innovative water sensitive urban design outcomes.

Developing and updating guidelines related to water sensitive urban design across the region will help industry deliver best industry practice approaches to water sensitive urban design infrastructure. Partnered projects and incentives will also be encouraged to implement water sensitive urban design, potentially including continual refinement of policies through to exemplar construction of infrastructure.

Box 9: Water sensitive urban design

Water sensitive urban design is an evolving practice to manage the urban water cycle. It is considered *'an approach to urban planning and design that aims to integrate the management of the urban water cycle into the urban development process'*. Plans and policies in place across the Commonwealth, ACT and NSW local government areas that encourage water sensitive urban design to be further incorporated into developments include:

- stormwater quality and quantity targets to mitigate the impacts of increasing frequency and quantity of stormwater from impervious surfaces on stormwater quality
- achieving mains water use reduction in new developments and redevelopments
- increasing porous paving to encourage onsite infiltration
- increasing green and living infrastructure in urban catchments to help ameliorate the urban heat experienced in our urban cities and towns.

Green infrastructure or living infrastructure involves the incorporation of natural features in urban areas to ameliorate excessive heat or flooding (extreme and nuisance); improve air, soil and water quality; and increase public amenity with green and water landscapes.

Living infrastructure requires a specific approach to design; one that combines both natural and engineered elements to perform a range of functions that deliver combined environmental, social and economic outcomes.



5.6 Theme: Water

GOAL: Water is managed in a total water cycle management regime.

Box 10: Summary of water factors

- All six jurisdictions are involved in water resource management at various levels.
- Variable water security across the region could provide a constraint to growth.
- Sustainable Diversion Limits (SDLs) under the Basin Plan (2012) will provide ongoing challenges for the sustainable development of the region. It will be an ongoing management issue to provide drinking water for a growing population while at the same time meeting the SDLs and providing sufficient water to maintain ecosystem functions.
- A number of councils such as Queanbeyan— Palerang and Yass Valley have identified securing water supply as a major operational constraint.
- Increase in the number of farm dams across the catchment, mainly associated with peri-urban development, reduces the surface water run-off. Dams also reduce groundwater flow, alter the size and timing of peak flows and cause water losses through evaporation.
- Villages such as Murrumbateman and Bungendore rely on groundwater. Murrumbateman's water supply capacity is insufficient to meet the current maximum peak day demand. The Murrumbateman Masterplan 2031 states that increased bore water usage by residents could increase salinity.
- Alteration of natural water temperatures patterns from dam releases is causing fluctuation of stream temperatures.
- In the past, bushfires such as those that occurred in 2003 impacted on the water supply catchment for the ACT.
- Large built up impervious areas have caused significant alterations and increases the number of run-off days causing changes to the natural hydrology of the water cycle.
- Zones subject to higher urbanisation generate significantly greater loads of pollutants (Total Phosphorous (TP) and Total Nitrogen (TN)) that discharge into stormwater catchments.
- In the ACT, a number of water bodies are occasionally closed to primary contact recreation (swimming) due to health concerns. The increase recreational uses can have the potential to impact on water quality, aquatic habitat and ecosystem functions.

Despite the limited size of the ACT and Region, there are a number of water utilities operating, including Icon Water and the local councils. Ensuring the ACT and Region has secure water supply of acceptable quality is fundamental to the Catchment Strategy.

Secure water supply is not only a question of infrastructure. A secure water supply requires policies and planning, acceptable water quality, functioning ecosystems, and the implementation of total water cycle management principles.



Stormwater channel at Lyneham wetlands

Acting on the factors that influence water, the management of water from a catchment management perspective is aimed at:

- efficient water supply and use
- water supply that is not adversely impacted by human activities within the catchment, including recreational activities
- improving ecosystem functions that are essential to sustain and maintain aquatic ecosystems and species, and clean water
- total water cycle management that takes a systems approach, providing life support for all species in terms of natural triggers for spawning and providing an important function in the food cycle. It recognises that every decision with water will influence the entire water cycle. These approaches deal effectively with the complex linkages between the different elements of the urban water cycle (water supply, sewage and stormwater)
- increasing our understanding of Indigenous water values and uses and incorporating those in water resource planning by participating in programs such as the Murray—Darling Basin Authority's Aboriginal Water Awareness project.

Water security and use

Having sufficient and high quality water is fundamental to supporting a growing region, a healthy environment and a liveable community.

Icon Water has recognised that Canberra's water supply and water and sewerage infrastructure are at risk from climate change and have taken significant steps to secure the region's water supply:

- the construction of the enlarged Cotter Dam which has increased our overall storage capacity by 35%
- the completion of the Murrumbidgee to Googong Water Transfer infrastructure project in 2013, a 12 kilometre pipeline that can transfer water from the Murrumbidgee River to Burra Creek and into the Googong Reservoir when needed and
- releases of water from Tantangara Dam, which are also currently being negotiated to allow the transfer of water.

Securing water for the ACT and Region is not solely reliant on building infrastructure such as dams and pipelines. Securing supply includes policies and planning such as water restrictions and water trading, optimal water quality for stock and domestic consumption, functioning ecosystems, and total water cycle management to mimic the natural water cycle. There are opportunities to investigate how the region can live within its sustainable diversion limits using an integrated and efficient water supply system.



Action 12: Develop regional capacity to implement and manage sustainable water infrastructure.

Activities summary

- Clarify the volume and quality of all water sources available in the region for sustainable water supply
- » Develop water trading to increase flexibility and security of supply
- Improve knowledge of potential impact of climate variability and extreme events to water across the region

What does this mean?

Understanding and clarifying the volume and quality of all water resources available across the region will ensure we will have a water supply that includes an optimal mix of scenarios that encourages efficient use of water, increases resilience to climate variability, and supports the social, economic and environmental needs of the community.

Developing water trading as an economic tool will also be essential in developing the most effective suite of options for water security. The impact of climate variability will include extreme events that may impact on our water volume and water quality across the region and we need to be placed to improve our knowledge on this potential impact.

Water quality and aquatic ecosystems

Poor water quality has been an issue for the ACT and Region in a number of our urban and natural waterways and in some storages following the 2003 Canberra bushfires.

Lake Burley Griffin and Lake Tuggeranong are periodically closed due to blue-green algal blooms caused by high nutrient levels. Our creeks and rivers carry high sediment loads from gully erosion and loss of riparian vegetation. Box 11 provides an example of collaboration between agencies and community stakeholders in dealing with turbidity through the Upper Murrumbidgee Actions for Clean Water Plan. Water quality is important to all life forms. Platypus, fish and aquatic insect species can be indicators of the overall health of the catchment. Improvement of water quality in our catchments can be achieved through erosion control, riparian vegetation establishment and enhancement, stormwater management, water sensitive urban design and regional planning.

Recreational use of water can also jeopardise water quality. Recently, there have been challenges in managing Googong Dam for both drinking water and recreational uses as demonstrated in Box 3.

There are opportunities to look at integrated water use across the region and ensuring that strategies focus on reducing nutrients and turbidity.

Aquatic ecosystems in the ACT and Region are currently degraded due to human activities. Aquatic and riparian ecosystems are an important component of our urban and non-urban areas as they provide water and amenity and are home for a wide variety of aquatic and terrestrial species. These ecosystems improve water quality by providing flood and erosion protection and reducing nutrient levels.

Environmental flows are essential for aquatic ecosystem health. Environmental flows consider the volume of water that flows through a river system, the annual pattern of flow, how long it lasts, and how frequently it flows. River regulation through dams and controlled release of water has had a substantial and ongoing impact on the rivers of the Murray—Darling Basin. River regulation has provided enhanced agricultural productivity and water for cites.

Regulation, however, has also altered the flows of our rivers and tributaries, disturbing the natural cycles of aquatic ecosystems.

Currently New South Wales and the Murray– Darling Basin Authority do not formally recognise the Upper Murrumbidgee as a regulated system, notwithstanding the major diversion of the natural flow into the Snowy Mountains Hydroelectric Scheme. Environmental flows operate in both NSW and ACT although each jurisdiction operates its environmental flows differently.



Action 13: Improve water quality, protect and restore aquatic ecosystem health, and reduce nutrient, sediment and pathogen loads and enhance aquatic ecosystem health at key sites across the catchment.

Activities summary

- Develop our understanding of source, activities and threatening processes generating nutrient pollutant load
- Develop and implement a benchmarking framework for priority waterways including targeted remediation strategies
- Identifying high priority aquatic ecosystems for management interventions that may include environmental flows and aquatic pest management

What does this mean?

Activities to improve water quality in the catchment aim to have a net benefit and improve ecosystem health. Firstly we need to understand the nature and source of nutrients and sediment and this may be done through a mass balance model or a study to inform our understanding of water quality impacts from peak flows and storm events for different types of catchments. Different catchments have different characteristics and understanding our catchment's source, activities and threatening processes will help us to understand the water quality impact and management options.

This information will help to develop 'fit for purpose' benchmarking framework for priority waterways. It allows decisions to be made on the preferred level of ecosystem health for each of the priority waterways based on its individual characteristics (e.g. classification of waterway, monitoring, performance reporting and licensing), its capacity to cope with pressures and changes, the social benefits and the use of the waterway and its role in the water supply.

The Catchment Strategy will identify management interventions. These may include opportunities for managing environmental flows in the different jurisdictions in conjunction with each other and managed with the objective of maintaining ecosystem health and function. Other management interventions may include joint recovery plans, continued restoration of riparian and in- stream habitat and aquatic pest management through to reference groups that may focus on specific pest species such as carp.

Box 11: The Upper Murrumbidgee Actions for Clean Water Plan

The Actions for Clean Water (ACWA) Plan is a collaborative, cross-jurisdictional plan which identifies strategies to improve water quality and reduce turbidity in the upper Murrumbidgee River catchment. It provides actions over one, three and ten year periods. The ACWA Plan involved collaboration between South East Local Land Services, the ACT Natural Resource Management Council, UMCCC, Upper Murrumbidgee Waterwatch, the former Cooma–Monaro Shire Council and Icon Water. The plan identifies and ranks major point sources of turbidity and details mitigation interventions. The plan covers a range of approaches including on-ground works, education and promotion, plus policy and program development by private sector, government organisations and individuals.



Naas River at Top Naas, ACT



Indigenous and cultural waters

Indigenous cultural and spiritual values in water are encouraged to be recognised in future water planning and management. The Echuca Declaration defines 'cultural flows' as: 'Water entitlements that are legally and beneficially owned by Indigenous nations of a sufficient and adequate quantity and quality to improve the spiritual, cultural, environmental, social and economic conditions of these Indigenous Nations.'

Action 14: Ensure Indigenous and other values are recognised.

Activities summary

» Include Indigenous water and other cultural values in managing water

What does this mean?

Aboriginal water and cultural values will be better understood and considered through engaging with the Aboriginal community. This includes recognising the significant areas such as our waterways with a 'sense of place' within the catchment. The activity focuses on celebrating diversity and culture with educational messages and involvement of the community.

Groundwater

Groundwater is perhaps the least understood aspect of the region's hydrology. Recent mapping work has provided more detailed knowledge of the interactions of hydrology and geology in the ACT, however an understanding of groundwater across the catchment and the cumulative extraction rates are not widely understood. Groundwater resources are utilised in the region for potable water supply in Murrumbateman and Bungendore, and in rural properties for drinking and irrigation. Groundwater is also utilised by golf courses and other community organisations for irrigation.

Yass Valley Council has identified the low capacity of the Murrumbateman groundwater supply as part of an improvement program for residential development. Groundwater extraction impacts on the overall water balance of the system, and are liable to over-extraction, resulting in falling water tables.

Work is needed to improve our knowledge of groundwater resources, which will in turn lead to a better understanding of what are the optimal rates of sustainable extraction.

Action 15: Develop a better understanding of groundwater resources (quantity and quality) within the region.

Activities summary

- » Determine extraction rates and evaluate their sustainability in terms of quantity and quality
- » Encourage aquifer and groundwater recharge

What does this mean?

An understanding of current extraction rates and its impacts will allow better assessment to inform future projections and predicted impacts on the hydrology cycle with a focus on groundwater quantity and quality.

Aquifer and groundwater recharge is a hydrologic process where groundwater is used as part of the water supply system in the region through an increased number of schemes, where appropriate.

Management of the ACT and Region's land and biodiversity involves an integrated and collaborative approach to deal with the degradation of the environment through physical and climate change.

Over the term of the Catchment Strategy, managing land and biodiversity in the ACT and Region will focus on collaborative policies, projects and practices.

5.7 Theme: Land and Biodiversity

GOAL: The ACT and Region catchment is a healthy ecological system that is resilient to stress and adaptive to change.

Box 12: Summary of land and biodiversity factors

- Urban expansion into intact habitats and ecosystems leads to significant negative impacts.
- The region has a number of threatened species and ecosystems.
- Gully erosion is the major process contributing sediment to the Murrumbidgee River (estimated at 51% of total input to the river across its catchment with much occurring upstream of the ACT).
- Contaminated sites throughout the Upper Murrumbidgee catchment have increasingly been identified with 147 new sites recorded for the ACT alone between 2007 and 2011, bringing the total number of recorded sites within the ACT to 899 (ACT Government, 2011). Additional contaminated sites are located with two sites in Yass and one in Cooma.
- Some jurisdictions lack land to create biodiversity offsets and this could impact on future urban development.
- Potential conflict between land and biodiversity management practices from different policies and plans.
- Growing population increases the number of travel routes resulting in higher biosecurity risks.
- Species shifting their distribution, including invasive species.
- Increased development potentially fragmenting landscapes and increasing soil erosion risk, as well as the discovery and exposure of contaminated sites.
- Climate change increasing extreme events such as fire, drought, high temperature and changed rainfall patterns impact on ecosystem functions and land condition.

Native vegetation loss and fragmentation affects the viability of populations of native species. Much research has been undertaken in recent years to help us better understand how to repair this fragmentation. Threatened species and communities must be considered in all planning and land use decisions.

Loss of vegetation has a flow on effect on other areas of the catchment including soil condition and water quality. Parts of the region are currently impacted by poor soil conditions, including areas in the southern section where soil has been categorised as low quality and highly erodible.

Loss of vegetation cover means that soil becomes unstable and prone to erosion and sediment is washed into nearby waterways increasing water turbidity, raising water tables and increasing salinity levels, which in turn affects the aquatic organisms and ecosystem function.

The Yass River and some of its tributaries have been identified as a major source of salinity loads in the Murrumbidgee catchment.

Land and biodiversity in catchment management is aimed at:

- a holistic and cross-border approach to information sharing, monitoring, data collection and collation to support decision making
- securing resources for on-ground activities that address the problems identified in existing and future plans through agreed resourcing frameworks
- improving community understanding of the links between the health of the catchment and its waters and human health and social amenity.



Agricultural land in Cooma

Biosecurity

Pest species and pathogens are a threat to the ACT and Region and cost the community considerable financial and physical investment to manage. Invasive pest plants and animals can change ecosystem dynamics through overgrazing, predation and displacement of native species.

Pest plants and animals can also have significant impacts on agricultural productivity. Invertebrate pests and disease pathogens can affect plant, animal and human health.

Biosecurity for the ACT and Region focuses on a strategic and integrated approach that encompasses the policy and regulatory frameworks that analyse and manage risks. Biosecurity threats need to be managed in a collaborative approach across catchments focusing on plant health, animal health and environmental and social values.

Weed management continues to be an issue for peri-urban and rural residential landscapes. The UMCCC Peri-Urban Weed Management Study has found that rural lifestyle landowners are often limited in their ability to respond to weed issues on their properties. These limitations are due to a lack of awareness, lack of knowledge of the problem different value sets from those of traditional rural landowners and a lack of time resources.

To ensure that future weed management strategies are successful in this new and changing rural landscape, management agencies will need to fully engage this critical group of emergent landscape managers.

Action 16: Implement an approach to biosecurity planning and risk management.

Activities summary

- » Aligning biosecurity strategies across the region
- » Support community education programs on biosecurity threats and weed management

What does this mean?

Implement a strong regional approach to biosecurity planning and risk management which involves aligning the biosecurity strategies in the region and expanding regional biosecurity working groups across jurisdictions.

Risk management of biosecurity threats will help us understand and plan across the region and prioritise threats and management.

Improving community engagement and education on biosecurity threats. This links back to Communities, Action 9.

Biodiversity

Biodiversity is the combination of diversity at genetic, species and ecosystem level. It makes human life and economic growth possible through the multiple ecosystem services that it provides. Such services include, but are not limited to, clean air and water, carbon sequestration, pollination, climate amelioration and nutrient cycling.

Our understanding of biodiversity in the region is growing and our management practices are constantly revised to incorporate new information and learning.

Biodiversity management across the catchment will aim for works in different catchments to be well aligned and coordinated where possible.

Action 17: Develop a regional approach to strategic land and biodiversity management practices.

Activities summary

- » Establish a regional approach to land and biodiversity management
- Collaboratively identify, protect and strengthen potential climate wildlife refuges (biodiversity refugia) across the landscape of the region
- » Identify mechanisms and sites for interjurisdictional biodiversity offsets and natural conservation areas
- » Build Indigenous engagement in biodiversity and land management

What does this mean?

Review and align inter-jurisdictional land and biodiversity management practices including investigating opportunities for regional landscape connectivity and mechanisms and sites for potential inter-jurisdictional biodiversity offsets and conservation areas.

Identifying and protecting climate wildlife refuges will ensure there are adequate refuges by providing small environmental flows for ecological benefits at times of extreme events and disasters.

Incorporating and promoting Indigenous culture and landscape management practices into biodiversity and land management to improve outcomes and enhance community inclusion.

Soil health

Healthy soil is the 'engine room' of our landscape. It supports a range of rural businesses, in particular grazing which has historically been important in the ACT and Region. The impacts of soil degradation and soil erosion are often raised as a concern in catchment management. The actions in this theme focus on preventing further decline and remediating the most at risk areas.

Effective management practices address long-term sediment and erosion problems, loss of fertile soils, salinity and loss of soil moisture, leading to better production performance across the landscape.

Illegal dumping of contaminated waste has also been highlighted as an issue in the region.

Action 18: Mitigate soil erosion at priority sites. Activity summary

» Identify and prioritise significant erosion hotpots and appropriate responses

What does this mean?

Clarify the soil health across the region and identify priority sites for remediation. This includes developing implementation responses as appropriate.

Action 19: Consider regional approaches to dealing with contaminated land illegal dumping of contaminated waste and dumping of sub-soil construction waste.

Activity summary

- Increase our understanding of contaminated sites and look at regional approach to remediation
- » Coordinate resources to deal with illegal dumping of contaminated waste and also the dumping of sub-soil construction waste

What does this mean?

Investigate a regional approach to contaminated land in terms of dealing with sites through potential collaborative approach to remediation resulting in better value for money. This includes a regional approach to illegal dumping of contaminated waste. Likewise the dumping of sub-soil from the construction of basements is an activity that causes water quality problems and sedimentation of streams especially when it consists of highly dispersible soils that are susceptible to erosion. The NSW and ACT jurisdictions currently applies this practice differently.



6. Implementation

The ACT and Region Catchment Strategy: Catchment Action Implementation Plan 2016—21 describes how the Strategy will be implemented over the next five years.

A review during the final year of each implementation plan will inform the next implementation plan.

6.1 How will the ACT and Region Catchment Strategy be rolled out?

The Catchment Action Implementation Plan provides a road map of the key actions required to establish the functions of the Coordination Group and lay the foundations for achievement of the Catchment Strategy's goals.

The timing to implement each action will be dependent upon agreed priorities, the complexity of the action and availability of resources. The Coordination Group will focus efforts to secure resources for actions that demonstrate cost effectiveness in terms of responding to catchment management priorities and achieving the greatest positive impacts. Actions and activities that are currently unfunded remain as future options for further consideration by relevant partners.

Unfunded actions will be the subject of future funding bids through a range of funding streams.

6.2 Adaptive management and implementation

The Catchment Action Implementation Plan utilises an adaptive management and implementation approach. Adaptive management and implementation is the process to plan, implement, evaluate and adjust (Figure 6). The Catchment Action Implementation Plan outlines this approach in greater detail.

By utilising the adaptive implementation process, the Catchment Action Implementation Plan has prioritised a number of actions to be carried out in the first period of the Catchment Strategy. The priorities were informed by the consultation that took place in the drafting of this strategy to determine a set of criteria.

As time progresses, the actions will be revised allowing us to be transform, adapt and re-prioritise.

The implementation of an action and its connected activities may require new resources and therefore could be delayed until those resources are secured. Opportunities to align current resources to implement actions across the region will be investigated. There are also opportunities to access grant programs using a regional approach. The Coordination Group provides a strategic avenue to submit project proposals that will generate a favourable cost-to-benefit ratio because it can be applied across the region.





7. Monitoring, evaluation and review

7.1 How will the Catchment Strategy be monitored?

The Catchment Strategy does not contain specific biophysical measurable targets at this stage as the actions relate to high level governance and relationship building between the different jurisdictions.

The Coordination Group will provide a report describing the group's activities to the ACT Minister for the Environment Minister within three months after the end of the financial year and the Minister will, within 21 days after receiving the report, table the report in the ACT Legislative Assembly. Tabling will include a statement by the Minister responding to any advice given, or recommendations made, in the group's annual report.

The annual report will be publicly available. Regularly reporting on targets or key performance indicators is important in determining the level of change required.

Condition assessment of the ACT and Region catchments will continue to be reported primarily through the State of the Environment Reports.

7.2 Targets

The Catchment Strategy has identified the importance of establishing catchment targets mainly relating to biophysical targets (e.g. water quality, land connectivity) through its implementation (See Action 4).

7.3 Review

A 30 year planning horizon is adopted for the Catchment Strategy.

Staged implementation plans will be monitored and reviewed to measure the progress and identify future priorities and milestones ensuring the Catchment Strategy remains current and able to respond to the latest challenges and knowledge.

The development of catchment targets will provide a useful mechanism for measuring the effectiveness of the actions against the Catchment Strategy vision of a healthy, productive resilient and liveable catchment.

A comprehensive review of the Catchment Strategy will be undertaken at ten year intervals to ensure the overarching policy framework for implementing the Coordination Group's responsibility in evolving with catchment management in the ACT and Region.

Endnotes

- 1. Photo: Melissa Adams Canberra Times 1 October 2013
- 2. Australian Bureau of Statistics, 2015, '3101.0 Australian Demographic Statistics June 2015'.
- 3. The region of Snowy Valleys Regional Council and the Snowy Monaro Regional Council (apart from the land inside the Upper Murrumbdgee River catchment boundary, are not included as the majority of land mass within these areas is National Parks and the scope of the Catchment Strategy covers the local government areas that are predominantly influenced by or impact on the ACT
- 4. Commonwealth, State/Territory and Local Government.
- 5. Commonwealth, NSW, ACT and four Local Government areas.
- 6. United Nations Development Programme (2015), Water governance Facility: Water Governance, http://watergovernance.org/water-governance/
- 7. Measham, T., Jacobs, B., and Brown P.R., Meta Learning from past adaptation, Node for Adaptive Communities, unpublished report to New South Wales Office of Environment and Heritage, 2014.
- 8. ACT Planning Strategy, Greater Capital Region Strategy, Regional Development Australia (Southern Inland) Plan, SE NSW Regional Action Plan
- 9. NARCliM uses the Weather Research and Forecasting (WRF) model, a dynamical regional climate model that gives high resolution projections of temperature, rainfall and many other meteorological variables. WRF has been demonstrated to be effective in simulating temperature and rainfall in NSW and ACT and provides a good representation of local topography and coastal processes. It was jointly developed by several major weather and research centres in the United States and is widely used internationally. WRF has different settings which reflect uncertainties in our understanding of some physical processes. Performing multiple model runs also captures more reliable information on rare, extreme weather events, such as heatwaves, heavy rain and drough
- 10. Icon Water, Materiality Matrix, <u>https://www.iconwater.com.au/~/media/Files/Icon%20Water/Environment/</u> Icon%20Water%20materiality%20web%20report.ashx?la=en.
- 11. Yass Valley Council (2013), Resourcing Strategy 2013-2017, <u>http://www.yassvalley.nsw.gov.au/sites/yassvalley/</u><u>files/public/images/documents/yassvalley/Council%20Documents/Resource_Strategy_FINAL_2013.pdf</u>.
- 12.ACT Government (2012), ap2, <u>http://www.environment.act.gov.au/__data/assets/pdf_file/0006/581136/AP2___Sept12_PRINT_NO_CROPS_SML.pdf</u>
- 13. Choy, D.L & Harding, J (2010). UMCCC Peri-urban Weed Management Study Exploring Agents of Change to Periurban Weed Management, Upper Murrumbidgee Catchment Coordinating Committee.




